

134.(New) The method of Claim 133, further comprising, after incorporating said polynucleotide into the genome of said germ cell, breeding said male non-human mammal with a female of its species to obtain a transgenic progeny expressing said fluorescent or light-emitting protein in at least one of its stem cells.

135.(New) The method of Claim 134, wherein breeding is by in vitro or in vivo fertilization of an ovum of said female.

136.(New) The method of Claim 133, wherein said cyclin A1 promoter sequence comprises SEQ. ID. NO. 2, or an operative fragment [or non-human homologue] thereof, or an operative derivative of any of these.

137.(New) The method of Claim 133, wherein said polynucleotide further comprises at least one insulator element flanking said transcriptional unit, whereby methylation in vivo of said promoter sequence is substantially prevented.

138.(New) The method of Claim 137, wherein at least one of said insulator element(s) is a chicken β -globin insulator element.

139.(New) The method of Claim 133, wherein said fluorescent or light-emitting protein is a green fluorescent protein, yellow fluorescent protein, blue fluorescent protein, phycobiliprotein, luciferase or apoaequorin.

140.(New) The method of Claim 133, wherein said non-human mammal is a non-human primate, a mouse, a rat, a rabbit, a gerbil, a hamster, a canine, a feline, an ovine, a bovine, a swine, a pachyderm, an equine, or a marine mammal.

141.(New) The method of Claim 133, wherein said germ cell develops into a male gamete after said polynucleotide is incorporated into the genome of said germ cell.

142.(New) The method of Claim 134, further comprising growing a stem cell of said progeny in vitro.

143.(New) The method of Claim 142, wherein said stem cell is grown in the presence of an inhibitor of DNA methylation.

144.(New) A selectable transgenic stem cell obtained by the method of Claim 133.

145.(New) The selectable transgenic stem cell of Claim 144, wherein said stem cell is a selectable transgenic male germ cell.

146.(New) A transgenic non-human mammal comprising the selectable transgenic stem cell of Claim 144.

147.(New) Semen of a non-human mammal comprising a male gamete obtained by the method of Claim 141.

148.(New) A method of producing a transgenic non-human mammalian line having native germ cells, comprising

breeding of the non-human mammal of Claim 146 with a member of the opposite sex of the same species; and selecting progeny for stem cell-specific expression of a xenogeneic fluorescent or light-emitting protein.

149.(New) A method of obtaining a selectable transgenic stem cell of a non-human mammal, comprising:

injecting into a gonad of a male non-human mammal a transfection mixture comprising at least one transfecting agent and at least one polynucleotide comprising a transcriptional unit of a cyclin A1 promoter sequence consisting of SEQ. ID. NO.:2, or an operative fragment or derivative thereof, said promoter sequence operatively linked to a DNA encoding a fluorescent or light-emitting protein, wherein said gonad contains a male germ cell of the non-human mammal, and wherein said germ cell is selected from the group consisting of spermatogonial stem cells, type B spermatogonia, primary spermatocytes, preleptotene spermatocytes, leptotene spermatocytes, zygotene spermatocytes, pachytene spermatocytes, secondary spermatocytes, spermatids, and spermatozoa;

causing said polynucleotide to be taken up by, and released into, said male germ cell;

incorporating said polynucleotide into the genome of said germ cell;

allowing said male germ cell to develop into a male gamete; and

breeding said male non-human mammal with a female of its species to obtain a transgenic progeny expressing said fluorescent or light-emitting protein in at least one of its stem cells, whereby said stem cell can be isolated or selected from a non-stem cell.

150.(New) The method of Claim 149, wherein breeding is by in vitro or in vivo fertilization of an ovum of said female.

151.(New) The method of Claim 149, wherein said polynucleotide further comprises at least one insulator element flanking said transcriptional unit, whereby methylation in vivo of said promoter sequence is substantially prevented.

152.(New) The method of Claim 151, wherein at least one of said insulator element(s) is a chicken β -globin insulator element.

153.(New) The method of Claim 149, wherein said fluorescent or light-emitting protein is a green fluorescent protein, yellow fluorescent protein, blue fluorescent protein, phycobiliprotein, luciferase or apoaequorin.

154.(New) The method of Claim 149, wherein said non-human mammal is a non-human primate, a mouse, a rat, a rabbit, a gerbil, a hamster, a canine, a feline, an ovine, a bovine, a swine, a pachyderm, an equine, or a marine mammal.

155.(New) The method of Claim 149, further comprising growing a stem cell of said transgenic progeny in vitro.

156.(New) The method of Claim 155, wherein said stem cell is grown in the presence of an inhibitor of DNA methylation.

157.(New) A selectable transgenic stem cell obtained by the method of Claim 149.

158.(New) The selectable transgenic stem cell of Claim 157, wherein said stem cell is a pluripotent, multipotent, bipotent, or monopotent stem cell.

159.(New) The selectable transgenic stem cell of Claim 157, wherein said stem cell is a spermatogonial, embryonic, osteogenic, hematopoietic, granulopoietic, sympathoadrenal, mesenchymal, epidermal, neuronal, neural crest, O-2A progenitor, brain, kidney, pancreatic, liver or cardiac stem cell.

160.(New) The selectable transgenic stem cell of Claim 157, wherein said stem cell is a selectable transgenic female or a selectable transgenic male germ cell.

161.(New) A transgenic non-human mammal comprising the stem cell of Claim 157.

162.(New) A male gamete obtained by the method of Claim 149.

163.(New) Semen comprising the male gamete of Claim 162.

164.(New) A method of producing a transgenic non-human mammalian line having native germ cells, comprising

breeding the non-human mammal of Claim 161 with a member of the opposite sex of the same species; and selecting progeny for stem cell-specific expression of a xenogeneic fluorescent or light-emitting protein.

165.(New) A selectable transgenic stem cell obtained by:
obtaining a male germ cell from a non-human mammal;
transfecting said male germ cell in vitro with a transfection mixture comprising at least one transfecting agent and at least one polynucleotide comprising a transcriptional unit of a human cyclin A1 promoter sequence operatively linked to a DNA encoding a fluorescent or light-emitting protein, wherein said male germ cell is selected

from the group consisting of spermatogonial stem cells, type B spermatogonia, primary spermatocytes, preleptotene spermatocytes, leptotene spermatocytes, zygotene spermatocytes, pachytene spermatocytes, secondary spermatocytes, spermatids, and spermatozoa;

causing said polynucleotide to be taken up by, and released into said male germ cell; and

fertilizing an ovum with said male germ cell such that a transgenic progeny expressing said fluorescent or light-emitting protein in at least one of its stem cells is obtained, said stem cell(s) being selectable from non-stem cells by detecting light emissions from said stem cell(s).

166.(New) The selectable transgenic stem cell of Claim 165, wherein said stem cell is a pluripotent, multipotent, bipotent, or monopotent stem cell.

167.(New) The selectable transgenic stem cell of Claim 165, wherein said stem cell is a spermatogonial, embryonic, osteogenic, hematopoietic, granulopoietic, sympathoadrenal, mesenchymal, epidermal, neuronal, neural crest, O-2A progenitor, brain, kidney, pancreatic, liver or cardiac stem cell.

168.(New) The selectable transgenic stem cell of Claim 165, wherein said stem cell is a selectable transgenic female germ cell or a selectable transgenic male germ cell.

169.(New) A transgenic non-human mammal comprising the selectable transgenic stem cell of Claim 165.

170.(New) Semen comprising the male germ cell of Claim 168.

171.(New) A method of producing a transgenic non-human mammalian line having native germ cells, comprising

breeding the non-human mammal of Claim 169 with a member of the opposite sex of the same species; and selecting progeny for stem cell-specific expression of a xenogeneic fluorescent or light-emitting protein.

172.(New) A transgenic non-human mammalian cell containing a nucleic acid construct, said nucleic acid construct comprising a human cyclin A1 promoter having nucleotide sequence (SEQ. ID. NO.:2), or an operative fragment [or non-human mammalian homologue thereof], or an operative derivative [of any of these].

173.(New) A transgenic non-human mammal comprising the cell of Claim 172.

174.(New) The transgenic non-human mammalian cell of Claim 172, wherein said cell is a transgenic stem cell.

175.(New) The transgenic stem cell of Claim 174, wherein said stem cell is a pluripotent, multipotent, bipotent, or monopotent stem cell.

176.(New) The transgenic stem cell of Claim 174, wherein said stem cell is a spermatogonial, hematopoietic, embryonic, osteogenic, granulopoietic, sympathoadrenal, mesenchymal, epidermal, neuronal, neural crest, O-2A progenitor, brain, kidney, pancreatic, liver or cardiac stem cell.

177.(New) The transgenic stem cell of Claim 174, grown in vitro.

178.(New) The transgenic stem cell of Claim 177, grown in the presence of an inhibitor of DNA methylation.

179.(New) A transgenic non-human mammal comprising the transgenic stem cell of Claim 174.

180.(New) The transgenic non-human mammal of Claim 179, wherein said non-human mammal is a non-human primate, a mouse, a rat, a rabbit, a gerbil, a hamster, a canine, a feline, an ovine, a bovine, a swine, a pachyderm, an equine, or a marine mammal.

181.(New) A method of obtaining a selectable transgenic stem cell of a mouse, comprising:

injecting into a gonad of a male mouse a transfection mixture comprising at least one transfecting agent and at least one polynucleotide comprising a transcriptional unit of a human cyclin A1 promoter sequence operatively linked to a DNA encoding a fluorescent or light-emitting protein, wherein said gonad contains a male germ cell of the mouse, and wherein said germ cell is selected from the group consisting of spermatogonial stem cells, type B spermatogonia, primary spermatocytes, preleptotene spermatocytes, leptotene spermatocytes, zygotene spermatocytes, pachytene spermatocytes, secondary spermatocytes, spermatids, and spermatozoa;

causing said polynucleotide to be taken up by, and released into, said germ cell; and

incorporating said polynucleotide into the genome of said germ cell, whereby a selectable transgenic stem cell is obtained expressing said fluorescent or light-emitting protein, by which said stem cell can be isolated or selected from a non-stem cell.

182.(New) The method of Claim 181, further comprising, after incorporating said polynucleotide into the genome of said germ cell, breeding said male mouse with a female mouse to obtain a transgenic progeny expressing said fluorescent or light-emitting protein in at least one of its stem cells.

183.(New) The method of Claim 182, wherein breeding is by in vitro or in vivo fertilization of an ovum of said female mouse.

184.(New) The method of Claim 181, wherein said cyclin A1 promoter sequence comprises SEQ. ID. NO.:2, or an operative fragment [or non-human homologue] thereof, or an operative derivative of any of these.

185.(New) The method of Claim 181, wherein said polynucleotide further comprises at least one insulator element flanking said transcriptional unit, whereby methylation in vivo of said promoter sequence is substantially prevented.

186.(New) The method of Claim 185, wherein at least one of said insulator element(s) is a chicken β -globin insulator element.

187.(New) The method of Claim 181, wherein said fluorescent or light-emitting protein is a green fluorescent protein, yellow fluorescent protein, blue fluorescent protein, phycobiliprotein, luciferase or apoaquorin.

188.(New) The method of Claim 181, wherein said germ cell develops into a male gamete after said polynucleotide is incorporated into the genome of said germ cell.

189.(New) The method of Claim 182, further comprising growing a stem cell of said progeny in vitro.

190.(New) The method of Claim 189, wherein said stem cell is grown in the presence of an inhibitor of DNA methylation.

191.(New) A selectable transgenic stem cell obtained by the method of Claim 181.

192.(New) The selectable transgenic stem cell of Claim 191, wherein said stem cell is a selectable transgenic male germ cell.

193.(New) A transgenic mouse comprising the selectable transgenic stem cell of Claim 191.

194.(New) Semen of a male mouse comprising a male gamete obtained by the method of Claim 188.

195.(New) A method of producing a transgenic murine line having native germ cells, comprising

breeding of the transgenic mouse of Claim 193 with a mouse of the opposite sex; and selecting progeny for stem cell-specific expression of a xenogeneic fluorescent or light-emitting protein.--.